IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: E. BOMBARDELLI et al.

National Stage of PCT/EP00/08367
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Examiner: Unassigned

For: CHALCONE COUMARINS

Attorney Docket No.: 7914-088

PRELIMINARY AMENDMENT

Box PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

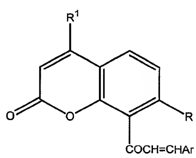
Please enter the following amendments and remarks into the file of the above-identified application prior to the examination thereof.

IN THE ABSTRACT

A marked up versions of the abstract showing insertions and deletions are included in Appendix A.

Please add the following abstract:

---Disclosed are novel chalcone derivatives having the formula (I).



(I)

These compounds possess antiproliferative activity, and are useful for the manufacture of a medicament for the treatment or prevention of neoplasms, particularly those located in the

uterus, ovary or breast. The compounds of the invention may also be useful in the manufacture of a medicament for the treatment or prevention of menopausal disorders and osteoporosis.--

IN THE SPECIFICATION

Marked up versions of all revised paragraphs showing insertions and deletions are included in Appendix B.

Replace the paragraph starting at page 1, line 3 with the following text:

--FIELD OF THE INVENTION

The invention relates to a novel class of compounds which have a structures related to naturally and synthetically occurring chalcones, as well as to methods for preparation of such compounds and to pharmaceutical uses thereof.--

Replace the paragraph starting at page 1, line 7 with the following text:

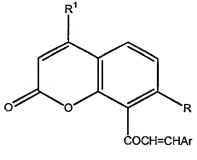
--TECHNICAL FIELD

The compound 1,3-diphenyl-2-propene-1-one is known by the trivial name chalcone. Many naturally occurring flavanoids share structural features with chalcone and are referred to by the generic term "chalcones". Also certain flavanoids, including ones which are classified as chalcones, have recently been demonstrated to have anticancer activity (Cancer Research, 48, 5754, 1988) and chemopreventive activity in some tumours (J. Nat. Prod. 53, 23, 1990).--

Replace the paragraph starting at page 1, line 28 with the following text:

--SUMMARY OF THE INVENTION

Thus according to one aspect of the present invention, there is provided a compound of Formula (I):



(I)--

Replace the paragraph starting at page 3, line 13 with the following text:

--DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

A preferred class of compounds of Formula (I) are those wherein Ar represents a substituted or unsubstituted (preferably aromatic), heterocycle group said heterocyclic group containing from 5 to 10 ring atoms, said ring atoms forming one or two rings, wherein the or each ring contains 5 or 6 ring atoms the heteroatoms being selected from N, O, and S , and any substituents on the Ar group being independently selected from the group consisting of:

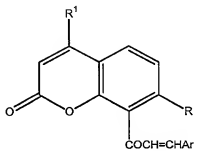
a) Cl, (b) Br, (c) F, (d) OH, (e) NO_2, (f) CF_3, (g) C_{1-4} lower alkyl (in particular CH_3), (h) SCH_3, (i) $NHCOCH_3$, (j) $N(R^6)(R^8)$ wherein R^6 and R^8 are the same or different and each represents H or lower C_{1-4} alkyl (preferably R^6 and R^8 are the same or different and each represent H or lower C_{1-4} alkyl), (k) OR^{10} wherein R^{10} represents a saturated or unsaturated lower C_{1-6} straight or branched hydrocarbyl group which may be unsubstituted or substituted by 1, 2, or 3 substituents selected from:

Cl, Br, F, OMe, NO_2 and, CF_3,

and (l) $-OCOR^{11}$ wherein R^{11} represents a saturated or unsaturated lower C_{1-6} straight or branched hydrocarbyl group or a phenyl group.--

IN THE CLAIMS

31. (New) A compound of Formula (I):



(I)

or a pharmaceutically acceptable salt or solvate thereof wherein:

Ar represents: a substituted or unsubstituted, aromatic or non-aromatic, carbocyclic or heterocyclic group having from 5 to 10 ring atoms or two rings with each ring containing 5 or 6 ring atoms, wherein the heterocyclic group comprises a heteroatom selected from N, O and S, and wherein the carbocyclic or heterocyclic group may be unsubstituted or substituted with

one or more substituents selected from the group consisting of: (a) Cl, (b) Br, (c) F, (d) OH, (e) NO_2, (f) CF_3, (g) C_{1-4} alkyl, (h) SCH_3, (i) $NHCOCH_3$, (j) $N(R^6)(R^8)$ wherein R^6 and R^8 are the same or different and each represents H or C_{1-4} alkyl, (k) OR^{10} wherein R^{10} represents a saturated or unsaturated C_{1-6} straight or branched hydrocarbyl group which may be unsubstituted or substituted with from 1 to 3 substituents selected from Cl, Br, F, OMe, NO_2 and CF_3, and (I) -$OCOR^{11}$ wherein R^{11} represents a saturated or unsaturated C_{1-6} straight or branched hydrocarbyl group or a phenyl group;

R represents OH, OR^{10} or $OCOR^{11}$ wherein R^{10} and R^{11} are as defined above; and R^1 represents H or a C_{1-6} straight or branched hydrocarbyl group which may be unsubstituted or substituted with from 1 to 3 substituents selected from Cl, Br, F, OMe, NO_2 and CF_3.

32. (New) The compound of claim 31, wherein Ar represents a substituted or unsubstituted, aromatic or non-aromatic, heterocyclic group having from 5 to 10 ring atoms or two rings with each ring containing 5 or 6 ring atoms, wherein the heterocyclic group comprises a heteroatom selected from N, O and S, and wherein the heterocyclic group can be unsubstituted or substituted with one or more substituents selected from the group consisting of: (a) Cl, (b) Br, (c) F, (d) OH, (e) NO_2, (f) CF_3, (g) C_{1-4} alkyl, (h) SCH_3, (i) $NHCOCH_3$, (j) $N(R^6)(R^8)$ wherein R^6 and R^8 are the same or different and each represents H or C_{1-4} alkyl, (k) OR^{10} wherein R^{10} represents a saturated or unsaturate C_{1-6} straight or branched hydrocarbyl group which may be unsubstituted or substituted with from 1 to 3 substituents selected from: Cl, Br, F, OMe, NO_2 and, and (l) -$OCOR^{11}$ wherein R^{11} represents a saturated or unsaturated C_{1-6} straight or branched hydrocarbyl group or a phenyl group.

33. (New) The compound of claim 31, wherein the Ar group is a heterocyclic group, wherein at least one of the ring atoms is a nitrogen atom.

34. (New) The compound of claim 33, wherein Ar represents pyridyl or indolyl.

35. (New) The compound of claim 31, wherein Ar represents a substituted or unsubstituted, aromatic or non-aromatic carbocyclic group.

36. (New) The compound of claim 31, wherein the substituents on the Ar group are selected from the group consisting of: $NHCOCH_3$, $N(R^8)(R^8)$, OR^{10},and $-OC0R^{11.}$

37. (New) The compound of claim 31, wherein Ar is substituted with one or more OR^{10} groups and R^{10} is a saturated or unsaturated C_{1-6} straight or branched hydrocarbyl group.

38. (New) The compound of claim 37, wherein R^{10} is methyl.

39. (New) The compound of claim 37, wherein Ar is a phenyl or a phenyl substituted with from 1 to 3 methoxy groups.

40. (New) The compound of claim 31, wherein R is an unsaturated C_{1-6} straight or branched hydrocarbyl group.

41. (New) The compound of claim 40, wherein R is $OCH=C(CH_3)_2$, $OCH_2CMe=CH_2$, $OCH_2CH=CH_2$, or $OCH_2C\equiv CH$.

42. (New) The compound of claim 31, wherein Ar is selected from phenyl, trimethoxyphenyl, 3-pyridyl, 4-pyridyl, and 3-indolyl; and R is selected from $OCH=C(CH_3)_2$, $OCH_2CMe=CH_2$, $OCH_2CH=CH_2$ or $OCH_2C\equiv CH$.

43. (New) The compound of claim 35, wherein

Ar is selected from phenyl, which may be unsubstituted or substituted with from 1 to 3 substituents independently selected from Cl, Br, F, OMe, NO_2, CF_3, C_{1-4} alkyl, NMe_2, NEt_2, SCH_3, and $NHCOCH_3$; thienyl; 2-furyl; 3-pyridyl; 4-pyridyl; or indolyl; and

R is selected from OH or OCH_2R^1, wherein R_1 is selected from $-CH=CMe_2$,

$-CMe=CH_2$, $-CH=CH_2$ and $-C\equiv CH$.

44. (New) The compound of claim 31, wherein R^6 and R^8 are the same or different and each is independently H or C_{1-4} alkyl.

45. (New) The compound of claim 31, wherein R^{10} and R^{11} are each independently a saturated or unsaturated C_{1-6} straight chain or branched hydrocarbyl group.

46. (New) The compound of claim 45, wherein R^{10} and R^{11} are selected from methyl, ethyl, n-propyl, and isopropyl.

47. (New) The compound of claim 31, selected from the group consisting of:

1-[4-methyl-7-(3-methylbut-2-enyloxy)coumarin-8-yl]-3-(pyridine-3-yl)propen-1-one;

1-[4-methyl-7-(3-methylbut-2-enyloxy)coumarin-8-yl]-3-phenylpropen-1-one;

1-[4-methyl-7-(3-methylbut-2-enyloxy)coumarin-8-yl]-3-(3,4,5-trimethoxyphenyl)-propen-1-one;

1-[4-methyl-7-(2-methylallyloxy)coumarin-8-yl]-3-(pyridine-3-yl)propen-1-one;

1-[4-methyl-7-(2-methylallyloxy)coumarin-8-yl]-3-phenylpropen-1-one;

1-[4-methyl-7-(2-methylallyloxy)coumarin-8-yl]-3-(3-methoxyphenyl)propen-1-one;

1-[4-methyl-7-(2-methylallyloxy)coumarin-8-yl]-3-(3,4,5-trimethoxyphenyl)propen-1-one;

1-[4-methyl-7-(allyloxy)coumarin-8-yl]-3-phenylpropen-1-one;

1-[4-methyl-7-(allyloxy)coumarin-8-yl]-3-(pyridin-3-yl)propen-1-one;

1-[4-methyl-7-(allyloxy)coumarin-8-yl]-3-(3-methoxyphenyl)propen-1-one;

1-[4-methyl-7-(allyloxy)coumarin-3-yl]-3-(3, 4 ,5-trimethoxyphenyl)propen-1-one;

1-[4-methyl-7-(prop-2-ynyloxy)coumarin-8-yl]-3-(3, 4, 5-trimethoxyphenyl)propen-1-one;

1 -[4-methyl-7-(prop-2-ynyloxy)coumarin-8-yl]-3-phenylpropen-1-one;

1 -[4-methyl-7-(prop-2-ynyloxy)coumarin-8-yl]-3-(pyridin-3-yl)propen-1-one; and

1 -[4-methyl-7-(prop-2-ynyloxy)coumarin-8-yl]-3-(3-methoxyphenyl)propen-1-one.

48. (New) A method of treating cancer in a patient comprising administering to the patient a compound of claim 31.

49. (New) A method of treating or preventing neoplasms in a patient comprising administering to the patient a compound of claim 31.

50. (New) The method of claim 49, wherein the neoplasms are located in the uterus, ovary, or breast.

51. (New) The method of claim 48, wherein the cancer is a paclitaxel or docetaxel resistant cancer.

52. (New) The method of claim 48, further comprising administering one or more antineoplastic agents.

53. (New) The method of claim 52, wherein antineoplastic agent comprises paclitaxel or docetaxel.

54. (New) A method of treating or preventing menopausal disorders and osteoporosis in a patient comprising administering to the patient a compound of claim 31.

55. (New) A pharmaceutical composition comprising a compound of claim 31 and a pharmaceutically acceptable excipient.

56. (New) The pharmaceutical composition of claim 55 further comprising one or more antineoplastic agents.

57. (New) The pharmaceutical composition of claim 56, wherein the antineoplastic agent is selected from paclitaxel or docetaxel.

A complete listing of the currently pending claims is provided in Appendix C for the Examiners convenience.

REMARKS

New claims 31-57 are pending in this application for the Examiner's review and consideration. Applicants have amended the specification and claims to conform with U.S. patent practice and to more clearly recite the invention. As no new matter has been added herein, these changes should be entered.

Respectfully submitted,

Paul E Dietz (45,627)

Date February 15, 2002

for Thomas G Rowan

Thomas G. Rowan (Reg. No. 34,419)

PENNIE & EDMONDS LLP
1667 K Street, N.W.
Washington, DC 20006

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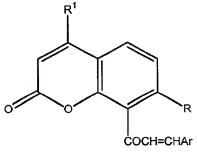
Appendix A

Changes to the Abstract

Please add the following abstract:

---Disclosed are novel chalcone derivatives having the formula (I).



(I)

These compounds possess antiproliferative activity, and are useful for the manufacture of a medicament for the treatment or prevention of neoplasms, particularly those located in the uterus, ovary or breast. The compounds of the invention may also be useful in the manufacture of a medicament for the treatment or prevention of menopausal disorders and osteoporosis.--

Appendix B

Changes to the Specification

Rewrite the paragraph starting at page 1, line 3 as follows:

--FIELD OF THE INVENTION

The invention relates to a novel class of compounds which have a structures related to naturally and synthetically occurring chalcones, as well as to methods for preparation of such compounds and to pharmaceutical uses thereof.--

Rewrite the paragraph starting at page 1, line 7 as follows:

--TECHNICAL FIELD

The compound 1,3-diphenyl-2-propene-1-one is known by the trivial name chalcone. Many naturally occurring flavanoids share structural features with chalcone and are referred to by the generic term "chalcones". Also certain flavanoids, including ones which are classified as chalcones, have recently been demonstrated to have anticancer activity (Cancer Research, 48, 5754, 1988) and chemo[reventive activity in some tumours (J. Nat. Prod. 53, 23, 1990).--

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--SUMMARY OF THE INVENTION

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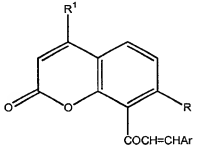

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or 6 ring atoms the heteroatoms being selected from N, O, and S , and any substituents on the Ar group being independently selected from the group consisting of:

a) Cl, (b) Br, (c) F, (d) OH, (e) NO_2, (f) CF_3, (g) C_{1-4} lower alkyl (in particular CH_3), (h) SCH_3, (i) $NHCOCH_3$, (j) $N(R^6)(R^8)$ wherein R^6 and R^8 are the same or different and each represents H or lower C_{1-4} alkyl (preferably R^6 and R^8 are the same or different and each represent H or lower C_{1-4} alkyl), (k) OR^{10} wherein R^{10} represents a saturated or unsaturated lower C_{1-6} straight or branched hydrocarbyl group which may be unsubstituted or substituted by 1, 2, or 3 substituents selected from:

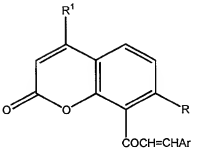
Cl, Br, F, OMe, NO_2 and, CF_3,

and (l) $-OCOR^{11}$ wherein R^{11} represents a saturated or unsaturated lower C_{1-6} straight or branched hydrocarbyl group or a phenyl group.--

Appendix C

Currently Pending Claims

31. (New) A compound of Formula (I):



(I)

or a pharmaceutically acceptable salt or solvate thereof wherein:

Ar represents: a substituted or unsubstituted, aromatic or non-aromatic, carbocyclic or heterocyclic group having from 5 to 10 ring atoms or two rings with each ring containing 5 or 6 ring atoms, wherein the heterocyclic group comprises a heteroatom selected from N, O and S, and wherein the carbocyclic or heterocyclic group may be unsubstituted or substituted with one or more substituents selected from the group consisting of: (a) Cl, (b) Br, (c) F, (d) OH, (e) NO_2, (f) CF_3, (g) C_{1-4} alkyl, (h) SCH_3, (i) $NHCOCH_3$, (j) $N(R^6)(R^8)$ wherein R^6 and R^8 are the same or different and each represents H or C_{1-4} alkyl, (k) OR^{10} wherein R^{10} represents a saturated or unsaturated C_{1-6} straight or branched hydrocarbyl group which may be unsubstituted or substituted with from 1 to 3 substituents selected from Cl, Br, F, OMe, NO_2 and CF_3, and (l) $-OCOR^{11}$ wherein R^{11} represents a saturated or unsaturated C_{1-6} straight or branched hydrocarbyl group or a phenyl group;

R represents OH, OR^{10} or $OCOR^{11}$ wherein R^{10} and R^{11} are as defined above; and R^1 represents H or a C_{1-6} straight or branched hydrocarbyl group which may be unsubstituted or substituted with from 1 to 3 substituents selected from Cl, Br, F, OMe, NO_2 and CF_3.

32. (New) The compound of claim 31, wherein Ar represents a substituted or unsubstituted, aromatic or non-aromatic, heterocyclic group having from 5 to 10 ring atoms or two rings with each ring containing 5 or 6 ring atoms, wherein the heterocyclic

group comprises a heteroatom selected from N, O and S, and wherein the heterocyclic group can be unsubstituted or substituted with one or more substituents selected from the group consisting of: (a) Cl, (b) Br, (c) F, (d) OH, (e) NO_2, (f) CF_3, (g) C_{1-4} alkyl, (h) SCH_3, (i) $NHCOCH_3$, (j) $N(R^6)(R^8)$ wherein R^6 and R^8 are the same or different and each represents H or C_{1-4} alkyl, (k) OR^{10} wherein R^{10} represents a saturated or unsaturate C_{1-6} straight or branched hydrocarbyl group which may be unsubstituted or substituted with from 1 to 3 substituents selected from: Cl, Br, F, OMe, NO_2 and, and (l) $-OCOR^{11}$ wherein R^{11} represents a saturated or unsaturated C_{1-6} straight or branched hydrocarbyl group or a phenyl group.

33. (New) The compound of claim 31, wherein the Ar group is a heterocyclic group, wherein at least one of the ring atoms is a nitrogen atom.

34. (New) The compound of claim 33, wherein Ar represents pyridyl or indolyl.

35. (New) The compound of claim 31, wherein Ar represents a substituted or unsubstituted, aromatic or non-aromatic carbocyclic group.

36. (New) The compound of claim 31, wherein the substituents on the Ar group are selected from the group consisting of: $NHCOCH_3$, $N(R^8)(R^8)$, OR^{10},and $-OC0R^{11}$.

37. (New) The compound of claim 31, wherein Ar is substituted with one or more OR^{10} groups and R^{10} is a saturated or unsaturated C_{1-6} straight or branched hydrocarbyl group.

38. (New) The compound of claim 37, wherein R^{10} is methyl.

39. (New) The compound of claim 37, wherein Ar is a phenyl or a phenyl substituted with from 1 to 3 methoxy groups.

40. (New) The compound of claim 31, wherein R is an unsaturated C_{1-6} straight or branched hydrocarbyl group.

41. (New) The compound of claim 40, wherein R is $OCH=C(CH_3)_2$, $OCH_2CMe=CH_2$, $OCH_2CH=CH_2$, or $OCH_2C\equiv CH$.

42. (New) The compound of claim 31, wherein Ar is selected from phenyl, trimethoxyphenyl, 3-pyridyl, 4-pyridyl, and 3-indolyl; and R is selected from $OCH=C(CH_3)_2$, $OCH_2CMe=CH_2$, $OCH_2CH=CH_2$ or $OCH_2C\equiv CH$.

43. (New) The compound of claim 35, wherein

Ar is selected from phenyl, which may be unsubstituted or substituted with from 1 to 3 substituents independently selected from Cl, Br, F, OMe, NO_2, CF_3, C_{1-4} alkyl, NMe_2, NEt_2, SCH_3, and $NHCOCH_3$; thienyl; 2-furyl; 3-pyridyl; 4-pyridyl; or indolyl; and

R is selected from OH or OCH_2R^1, wherein R_1 is selected from $-CH=CMe_2$, $-CMe=CH_2$, $-CH=CH_2$ and $-C\equiv CH$.

44. (New) The compound of claim 31, wherein R^6 and R^8 are the same or different and each is independently H or C_{1-4} alkyl.

45. (New) The compound of claim 31, wherein R^{10} and R^{11} are each independently a saturated or unsaturated C_{1-6} straight chain or branched hydrocarbyl group.

46. (New) The compound of claim 45, wherein R^{10} and R^{11} are selected from methyl, ethyl, n-propyl, and isopropyl.

47. (New) The compound of claim 31, selected from the group consisting of:

1-[4-methyl-7-(3-methylbut-2-enyloxy)coumarin-8-yl]-3-(pyridine-3-yl)propen-1-one;

1-[4-methyl-7-(3-methylbut-2-enyloxy)coumarin-8-yl]-3-phenylpropen-1-one;

1-[4-methyl-7-(3-methylbut-2-enyloxy)coumarin-8-yl]-3-(3,4,5-trimethoxyphenyl)-propen-1-one;

1-[4-methyl-7-(2-methylallyloxy)coumarin-8-yl]-3-(pyridine-3-yl)propen-1-one;

1-[4-methyl-7-(2-methylallyloxy)coumarin-8-yl]-3-phenylpropen-1-one;

1-[4-methyl-7-(2-methylallyloxy)coumarin-8-yl]-3-(3-methoxyphenyl)propen-1-one;

1-[4-methyl-7-(2-methylallyloxy)coumarin-8-yl]-3-(3,4,5-trimethoxyphenyl)propen-1-one;

1-[4-methyl-7-(allyloxy)coumarin-8-yl]-3-phenylpropen-1-one;

1-[4-methyl-7-(allyloxy)coumarin-8-yl]-3-(pyridin-3-yl)propen-1-one;

1-[4-methyl-7-(allyloxy)coumarin-8-yl]-3-(3-methoxyphenyl)propen-1-one;

1-[4-methyl-7-(allyloxy)coumarin-3-yl]-3-(3, 4 ,5-trimethoxyphenyl)propen-1-one;

1-[4-methyl-7-(prop-2-ynyloxy)coumarin-8-yl]-3-(3, 4, 5-trimethoxyphenyl)propen-1-one;

1 -[4-methyl-7-(prop-2-ynyloxy)coumarin-8-yl]-3-phenylpropen-1-one;

1 -[4-methyl-7-(prop-2-ynyloxy)coumarin-8-yl]-3-(pyridin-3-yl)propen-1-one; and

1 -[4-methyl-7-(prop-2-ynyloxy)coumarin-8-yl]-3-(3-methoxyphenyl)propen-1-one.

48. (New) A method of treating cancer in a patient comprising administering to the patient a compound of claim 31.

49. (New) A method of treating or preventing neoplasms in a patient comprising administering to the patient a compound of claim 31.

50. (New) The method of claim 49, wherein the neoplasms are located in the uterus, ovary, or breast.

51. (New) The method of claim 48, wherein the cancer is a paclitaxel or docetaxel resistant cancer.

52. (New) The method of claim 48, further comprising administering one or more antineoplastic agents.

53. (New) The method of claim 52, wherein antineoplastic agent comprises paclitaxel or docetaxel.

54. (New) A method of treating or preventing menopausal disorders and osteoporosis in a patient comprising administering to the patient a compound of claim 31.

55. (New) A pharmaceutical composition comprising a compound of claim 31 and a pharmaceutically acceptable excipient.

56. (New) The pharmaceutical composition of claim 55 further comprising one or more antineoplastic agents.

57. (New) The pharmaceutical composition of claim 56, wherein the antineoplastic agent is selected from paclitaxel or docetaxel.